



**Evaluating the Impact of
Professional Learning in STEM:
*Building a STEM Nation***

**Final Report – Executive Summary
for
Education Scotland**

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Executive Summary

Education Scotland (ES) commissioned ekosgen in partnership with Context Economics to evaluate the impact of Round One of the 'Enhancing Professional Learning in STEM Grants Programme'. Delivered in support of the STEM Education and Training Strategy, Round One the Programme supported 24 regional and national partners with funding of £759,000 to deliver a variety of projects that support STEM professional learning. The evaluation research combined a desk review of programme documentation and monitoring information with a programme of primary research that engaged STEM practitioners from all education sectors, as well as STEM learners. As part of the study, an update to the evidence base for STEM education and attainment was undertaken. At this stage, this was done for contextual purposes; it is anticipated that any impact on STEM education and attainment arising from delivery of the STEM Grants Programme will be realised in the longer term.

The STEM Grants Programme

The STEM Grants Programme was launched in October 2018 to increase access to STEM learning opportunities, to build the capacity and confidence of practitioners, and to support the implementation of the STEM Education and Training Strategy for Scotland. The Programme is being delivered across all education sectors: early learning and childcare (ELC), primary, additional support needs (ASN) and secondary school, community learning and development (CLD), and school-based technical support staff. It aims to deepen and extend the subject knowledge to improve STEM learning and teaching, and ensure that professional learning reaches new audiences and geographies and builds on existing STEM professional learning provision.

Supporting project delivery and administering the STEM Grants Programme, a team of eight regional STEM Education Officers has been in place since January 2019. The team's work is aligned to the work of the six Regional Improvement Collaboratives (RICs). It also plays a lead role in coordinating and leading the provision of STEM CLPL. The team is supported by an Improving Gender Balance & Equalities (IGBE) team of six officers.

Projects with a variety of delivery models for enhancing professional learning in STEM, including online learning, plenary workshops and one-to-one mentoring, were delivered across 27 local authorities in Scotland during 2018 and 2019 as part of the STEM Grants Programme Round One. STEM professional learning reached practitioners across the whole of Scotland, in part through the delivery of online learning and training sessions, but also due to the volume of sessions offered. Overall some 75% of the projects funded aimed to engage with the primary sector and half with the secondary sector. CLD was targeted by over a third of all projects whilst the college and additional support needs sectors were targeted to a lesser extent. Many projects aimed to engage with more than one education sector.

Round One projects

Targeting and engagement

Projects have targeted a wide range of groups through a wide variety of engagement practices and methods. There has been particular interest and engagement amongst Early Years and primary school teachers and in community learning, where confidence to deliver STEM learning is lowest.

Engagement has been achieved through member networks, local authorities and school clusters. Some secondary school practitioners have been harder to engage, where the need for STEM CLPL may require different approaches, given that teachers more regularly deliver subject-specific STEM education.

Partnership working has been a feature of many STEM Grants Programme projects, and this has increased engagement levels in many cases. However, there were occasional challenges in this collaborative approach. For example, external (non-public sector) delivery organisations can find it difficult to engage with local authorities, particularly if this is a less familiar way of working for the external organisation or the local authority.

There is scope for even further engagement in delivery, for example extending STEM CLPL into the Third Sector, given the success of STEM CLPL in community learning and with young people.

Equity and equality

Projects have been increasing access to STEM CLPL for practitioners across Scotland and in many cases they have specifically brought additional CLPL to new groups of practitioners and geographies. Strong engagement of Early Years and community learning practitioners is increasing access to STEM among young learners and those not typically involved in STEM learning.

Many projects have increased access to STEM CLPL in rural areas, with online approaches extending reach to the rural north of Scotland in particular, where there have been advances in the digital infrastructure to facilitate online learning. A smaller number of projects have specifically targeted areas of deprivation. One focused on gender and areas of rural deprivation, another on a relatively deprived rural community. On the whole, projects have been open to all practitioners across a group (e.g. Childminders) or a geography, and so access to STEM CLPL has increased considerably as a result.

Delivery models

There are strong levels of partnership working, particularly in the development of new materials and content, for example between local authorities and Science Centres, and this collaboration has been effective. A mix of online and outreach has been an effective delivery model, with outreach helping to engage and enthuse practitioners around good quality materials and resources. Online resources and new content are an effective way of reaching time poor practitioners. Ensuring face-to-face workshops/learning sessions are accessible and at times practitioners can access them are more effective than other approaches.

School clusters can be an effective route to practitioners, although primary schools are generally more active and engaged than secondary schools. Working through strong member networks has been effective, which can achieve wide reach, although if projects needed to go beyond member networks, engagement proved more challenging.

Innovation

Round One projects have employed a wide range of new approaches, utilising newly developed content, and this new content has been a feature of the Round One funded projects. In many instances the funding has enabled practitioners and partner organisations to collaborate and plan new programmes of activity based around STEM. New ways of bringing practitioners together around STEM learning online have been developed as a result, and this continues to evolve.

Sustainability

A lot of the new content and resources developed are online and could be made available more widely at little additional cost. Whilst outreach and face-to-face engagement activity is understandably more expensive to deliver, relatively modest additional resource could extend the reach of physical engagement for CLPL further, alongside the online resources developed.

Some local networks are developing with practitioners coming together to share resources and best practice. Continuing to cascade training to more practitioners through the projects and networks would further extend the reach of STEM CLPL learning.

Programme management

The Round One Grants have been welcomed by the successful project applicants. Funding supported additional activity that otherwise could not and would not have been funded in the vast majority of cases. Education Scotland officer support was praised and extremely welcome, especially by less experienced applicant organisations.

Some grant administration issues negatively impacted on project delivery timescales, especially those requiring set-up including recruitment of staff or researchers. A more programmed and communicated approach would avoid the potential for duplication of activity and effort which was identified in a small number of cases.

Programme benefits, challenges and impacts

The Round One projects have improved access to STEM professional learning by removing barriers to CLPL. There has been some high quality content prepared and high levels of enthusiasm for delivering STEM CLPL that is inspiring STEM practitioners, notably in Early Years, primary schools and community learning.

In doing so, they have enhanced the confidence and capability of STEM practitioners across the different education sectors. Round One projects have contributed to Excellence, Equity, Inspiration and Connections. Skills, confidence and capability have been enhanced, and learning has been cascaded more widely amongst peers and within settings by beneficiary practitioners.

Projects have boosted practitioner confidence; however given low levels of prior confidence in STEM this may need to be boosted on an ongoing basis (at least in the short-term). Awareness of the need to proactively address equity issues has been increased amongst STEM practitioners. This is supporting an improvement in equity and equality measures amongst learners.

Projects have inspired learners to engage more with STEM learning, and this is driving more positive views and aspirations of STEM careers. They have also driven the development of practitioner networks. This is very positive, given that younger learners are those STEM career professionals of the future.

Recommendations

The Round One projects delivered have helped to realise some strong and tangible benefits. Based on the findings of the Round One evaluation, the following recommendations are made:

Recommendation 1: Targeting and engagement. There are a number of areas worth consideration with respect to education sectors and other groups. This includes: expanding reach where significant impact has been evidenced; considering more innovative means of engagement with less-engaged practitioner groups, e.g. co-design of projects or CLPL; ensuring greater balance of projects addressing all education sectors, geographies and target groups; and ensuring that overlap and duplication of activity is minimised.

Recommendation 2: Build innovation (in design and delivery) into the project application criteria of future funding rounds, to push the boundaries of how innovative approaches can increase access and participation levels in STEM learning.

Recommendation 3: Scalability: Whilst constant innovation in project design and delivery is important so too is identifying and supporting those projects with the potential to be scaled up and rolled out to more and new practitioner groups and geographies. Low-cost equipment and resources, toolkits to 'train the trainer', greater use of digital platforms and STEM ambassadors can all help to facilitate project scale-up, thus maximising project investment.

Recommendation 4: Consider continued funding for 'successful' projects: For those projects which have reached or exceeded targets and received good evaluative feedback from practitioner/other types of groups and partners, consider continued funding for the project's 'Version 2'. However, the focus of the project design and planning should be on the process and resourcing required for scaling up and rolling-out to wider audiences.

Recommendation 5: Complementarity of projects. There is the potential for organisations to design and plan projects in partnership, within and across RICs, to build national level connections. This will allow for the co-ordination of CLPL activity and can minimise duplication, and may also allow for progression pathways within CLPL practitioner settings. This, would be a more cost effective use of STEM Grants Programme resources, and has the potential to further increase access to CLPL, including to harder to engage groups.

Recommendation 6: Review the funding/process for scoping and designing new projects. Where elements of projects require new resourcing/staffing cognisance of potentially longer project set-up and lead in times is needed. This is especially the case where the recruitment of new staff is required and, in some cases lengthy public sector procedures and processes must be adhered to.

Recommendation 7: Improving performance monitoring and measurement at project and programme level. Programme monitoring has evolved and improved for Round Two of the STEM Grants Programme. However, there are benefits to developing and implementing a more structured approach to both individual and overall programme monitoring. An overarching monitoring system with a suite of programme and project performance indicators, supported by clear definitions and guidance, will provide consistency and rigour to data collection and analysis and allow for the provision of a robust evidence base for future planning and decision making.

The next stage of the evaluation will focus on Round Two delivery of funded projects and some aspects of programme management and delivery. The ekosgen team will work with the Education Scotland team to refine the evaluation approach to maximise the learning that can be gained from the next round of delivery.